COMPARITIVE ANALYSIS OF MET, PNF AND CONVENTIONAL PHYSIOTHERAPY IN IMPROVING FeV1 AND VITAL CAPACITY IN COPD PATIENTS

A dissertation submitted in partial fulfillment of the requirement for the degree of

MASTER OF PHYSIOTHERAPY

(ELECTIVE – ADVANCED PT IN CARDIO RESPIRATORY)

To

The Tamil Nadu Dr. M.G.R. Medical University

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INTERNAL EXAMINER:

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AT

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI.

APRIL 2012

CERTIFICATE

Certified that this is the bonafide work of Mr.Amithab.M of R.V.S. College of Physiotherapy, Sulur, Coimbatore submitted in partial fulfillment of the requirements for Master of Physiotherapy Degree course from The Tamilnadu Dr M.G.R Medical University under the Registration No: **27101913**

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I, Thank GOD ALMIGHTY for providing me the wisdom and knowledge to complete my study successfully.

This study will be an incomplete one without my gratitude towards my ‘Lovable Parents’ who made me what I am today.

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DECLARATION

I hereby declare and present my project work **COMPARITIVE ANALYSIS OF MET, PNF AND CONVENTION PHYSIOTHERAPY IN IMPROVING FeV1 AND VITAL CAPACITY IN COPD PATIENTS.** The outcome of original research work under taken and carried out by me under the guidance of Mr M.K.Franklin Shaju M.P.T, M.S.P.T, PG. Dip (Bio-stat) (Ph.D.) Associate professor of R.V.S. College of physiotherapy, Sulur, Coimbatore, Tamilnadu.

I also declare that the material of this project has not formed in anyway the basis for the award of any other degree previously from The Tamil Nadu Dr.M.G.R.Medical University, Chennai

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1 INTRODUCTION

Chronic obstructive pulmonary disease is a global health concern and is major cause of chronic morbidity and mortality worldwide. American thoracic society has defined COPD as a disease state characterized by the presence of air flow limitation due to chronic bronchitis, emphysema, bronchial asthma and bronchiactasis, the air flow obstruction is progressive may be accompanied by airway hyper reactivity and may be partially reversible.

Chronic bronchitis can be defined clinically persistent cough with expectoration on most days for at least three months of a year for two or more consecutive years. It is usually associated with history of smoking. For the first few years there are reversible changes in airways occur. Over 10 to15 years mucus hyper secretion occurs later irreversible damage occurs. There will be reduction in FEV, increased heterogeneity of the distribution of ventilation, general debility and deconditioning ensue.

Pulmonary emphysema as combination of permanent dilation of air spaces distal to terminal bronchioles and destruction of walls of dilated air space. A less common type of emphysema is not associated with smoking is alpha antitrypsin deficiency. A deficiency in antitrypsin reduces lung elasticity and contributes to the increase in lung compliance that is the hallmark of emphysema.

Bronchial asthma is a common respiratory condition that is characterized by hypersensitivity of the airways to the various triggers resulting in reversible airway obstruction. In severe cases asthma can be life threatening. Breathing through narrow airways contribute to

wheezing reduced alveolar ventilation rapid shallow breathing shortness of breath increased work of breathing desaturation and cyanosis.

Bronchiectasis is characterized by dilation and anatomical distortion of the airways and obliteration of peripheral bronchial tree.It is often a sequelae of prolonged chronic lung infection. Fibrotic connective tissue changes in the wall further to dilation and airway distortion. These anatomical changes adversely affect normal airway mechanics and hence pressure volume characteristics of lungs. The chest wall become hyper inflated and assumes the barrel shape associated with chronic airway limitation.

Exposure to tobacco smoke is most significant risk factor of chronic obstructive pulmonary disease. The second most Risk factor is alpha antitrisprin deficiency certain occupational exposures also cause chronic obstructive pulmonary disease.

Chronic obstructive pulmonary disease is not a reversible condition but pharmacological treatment in valves bronchodilators and anti inflammatory drugs. Mucolyte helps to break mucus. Vaccination against flu, influenza and pneumonic surgeries like bulletomy, lung volume reduction surgery, lung transplantation done in advanced cases.

Physiotherapy for chronic obstructive pulmonary disease include techniques like postural drainage with percussion, positioning, breathing exercise, autogenic drainage, active cycle of breathing, proprioceptive neuro muscular facilitation breathing technique, muscle energy technique, chest mobilization exercise, upper extremity exercise. Equipments like flutter, incentive spirometry, PEP mask is also used in pulmonary rehabilitation.

PNF (Proprioceptive neuromuscular facilitation technique) was developed originally in eary1950's by Dr Herman Kobart and Maggie Knot. The goal of this technique was to strengthen muscle in movement pattern in which they are designed in function .the pattern of movement used in PNF is mass movement pattern which is characterized by normal motor activity

It is used to develop muscle strength, endurance facilitate mobility, stability, control and coordinated movement and lays a foundation for the restoration of function. Hallmark of this approach to therapeutic exercise are the use diagonal pattern of movement with techniques of neuromuscular facilitation to evoke motor response and improve neuromuscular control and function. The diagonal movement is given directly to chest wall, upper chest, sternum and diaphragm.

The pattern of the movement associated with this technique is evolved from the idea of stretching muscles to stimulate the activity of muscle spindle. The position of stretch in lengthened position is the starting position of each pattern and stretch stimulus maintained throughout the movement .The brain detect not of a muscle but movement. All components of the pattern particularly the rotating component must be stretched simultaneously the reflex contraction of muscle movement is used to initiate voluntary movement.

If the patient is having great motor control an upright version of technique can be used. That is the butterfly technique .This technique can be modified to encourage more intercostals and oblique abdominal muscle contraction by using a diagonal rather than using a straight plane.

MET (Muscle Energy Technique) is a manual technique that involves the voluntary contraction of a muscle defined in a precisely controlled direction in varying levels of intensity against a distinguish directed counter force applied by therapist. MET techniques can shorten or lengthen the distance between the origin and insertion of muscles.

MET decreases muscle hypertonicity, lengthen muscle fibre, reduce the restrain of movement, produce joint mobilization improve respiratory and circulatory function and strengthen the weaker side if there is asymmetry. They are post isometric relaxation and reciprocal inhibition Post isometric relaxation refers to the effect of the subsequent reduction in tone experienced by a muscle or group of muscle after brief periods during which an isometric contraction .

A further variation involves the physiological response of the antagonist of a muscle which has been isometric contraction that is Reciprocal Inhibition. When a muscle is isometrically contracted the antagonist will inhibited and will demonstrate reduced tone immediately following contraction.

The effect of post isometric relaxation on the other hand is said to be mediated by the afferent input from golgi tendon organ. When a muscle is held in a isometrically contracted position the afferent feedback leads to the inhibition of the given muscle which is thought to result in relaxation of the muscle when the contraction is released.

Diaphragmatic breathing is the normal mode of respiration. The patient with primary pulmonary disease should be instructed in relaxation of the accessory muscles to decrease the work of breathing. Controlled

diaphragmatic breathing needs to be emphasized on all postures and with all therapeutic activities.

Relaxed Purse lip breathing is also a technique used to reduce respiratory rate. By prolonging the expiratory phase through pursed lip the patient secondarily decreases respiratory rate, it is good enough to reduce the shortness of breath.

Chest mobilization exercise is effective in all patients as it mobilize the chest wall, upper extremity and upper back. It will produce a stretching to the chest wall there will be stretching of lungs also as there is connection with chest wall parietal pleura and visceral pleura. This will improve the air entry of the lung and it can be performed in warm up training also.

1.1 Statement of problem

“Comparative analysis of MET, PNF and conventional physiotherapy in improving Fev1 and vital capacity in chronic COPD patients”

1. 2. Objective

- To find out the effectiveness of MET to increase FeV1 & Vital Capacity in COPD patients along with Conventional Physical therapy.
- To find out the effectiveness of PNF techniques to increase FeV1 & Vital Capacity in COPD patients along with Conventional Physical therapy.
- To find out the effectiveness of Conventional Physical therapy to increase FeV1 & Vital Capacity in COPD patients.

1.3 Hypothesis

1.3.1 Null Hypothesis:

(Ho1) There is no significant difference among MET, PNF techniques and conventional physiotherapy in improving FeV1 in patients with COPD.

(Ho2) There is no significant difference among MET, PNF techniques and conventional physiotherapy in improving vital capacity in patients with COPD.

1.3.2 Alternate Hypothesis:

(Ha1) There is significant difference among MET, PNF techniques and conventional physiotherapy in improving FeV1 in patients with COPD.

(Ha2) There is significant difference among MET, PNF techniques and conventional physiotherapy in improving vital capacity in patients with COPD.

1.5 Operational Definition

Proprioceptive Neuromuscular Facilitation:

It is an approach to therapeutic exercise that combines functionally based diagonal pattern of movement with techniques of neuro muscular facilitation to evoke motor responses and improve neuro muscular control and function.

Muscle energy technique:

Patient uses his muscle on request from a precisely controlled position in a specific direction against a distinguish directed counter force.

Breathing exercise:

A broad category of physical activity designed to increase strength and endurance of the respiratory muscles.

Chronic obstructive pulmonary disease:

It is chronic slowly progressive disorder characterized by air flow obstruction.

Analysis: A detailed examination of structure of something.

Post isometric relaxation:

It refers to the effect of subsequent reduction in tone experienced by a muscle or group of muscle after brief period during which an isometric contraction has been performed.

Reciprocal inhibition:

A muscle group is isometrically contracted the antagonist will inhibited and will demonstrate reduced tone immediately following contraction.

2. REVIEW OF LITERATURE

Muscle Energy Technique

1.Donald.R Noll: Brian F Degenhardt, Immediate Effects of osteopathic manipulative treatment in elderly patients with COPD

Donald and collaborates investigate the immediate effect of osteopathic manipulation treatment of pulmonary function parameters in COPD patients OMT protocol consist of seven standard including MET .The study reports shows that there is initial worsening of and pulmonary function improved. It helps the patient in relaxed stage relieved rib cage restriction and augment circulatory and lymphatic flow within lung parenchyma and rib cage

2.Lenehan, KL, fryer, Gary, Patrick, The effect of Muscle energy techniques on gross trunk range of motion

Lenehan and his collaborates study examined single application of thoracic MET could significantly increase the range of motion in asymptomatic volunteers with restricted active trunk rotation. MET applied to the thoracic spine in the direction of restricted rotation produces increased rom

3.Robert C.Ward, Raymona J Hruby, John a Jerome Foudation for Osteopathic Medicine, 2nd edition p88

MET decrease muscle hyper tonicity, lengthen muscle fibers reduce the restrain of movement produce joint mobilization, improve respiratory and circulatory function and strengthen the weaker side if there is asymmetry

Proprioceptive Neuro Muscular Facilitation

4.P.J Wijkstra, W. Van De. Mark, J Kran, R. Van Alten, Effects of home Rehabilitation on physical performance in patients with COPD, European respiratory Journal, vol9, 104-110, 1996

P J Wijkstra and his collaborates investigate with PNF in COPD patients. It has beneficial effect on dypsnoea lactate production metabolic gas exchange and work load of inspiratory muscle

5.**A L Ries, B Ellis R W Hawkins, Upper extremity exercise training in COPD chest journal**

A L Ries and collaborates study evaluate patients with COPD was given gravity assisted upper extremity training breathlessness is and fatigue is decreased in all groups, the study conclude that specific upper extremity training may be beneficial in the rehabilitation of patients with COPD

6.Micheal T Putt, MBBS Michelle Watson, Bphty, Helen seale Muscle stretching technique increases vital capacity and range of motion in patients with COPD, Journal Of American academy of physical medicine and rehabilitation 2008:89; 1103-7

Micheal and collaborates investigated by a specific PNF technique was capable of reversing the effect of tight chest wall muscle by increasing chest expansion, vital capacity and decreased perceived dypsnoea in COPD. The result of the study is able to increase rom of trunk and shoulder and increase the vital capacity of COPD patients

7.Susan .E .Bennet ,James .L. Karnes, Neurolugical Disabilities 1998

The goal of PNF was to strengthen the muscle in movement in which they are designed in function. The pattern of the movement are mass movement pattern which are characterized of normal motor activity

8. Dr. Jennifer article published on online 29th march 2006,volume-7,issue-4 page 228-238]

The PNF technique was found to be the main contributors to improvement in spo2 for subject with myotonic dystrophy

9. **T. Pakree. FCerny and b.Bishop** [volume 88, issue 2, February 2002, page 89-97**.** Inter costal stretch alter breathing pattern and respiratory muscle activity in conscious adult

Breathing Exercise

10.Tockman[1995] when a person reaches 55, his or her respiratory muscles start to weaken. Chest wall compliance began to decrease and there is loss of elastic recoil as a result of ventilation and gas exchangs are affected.

11.Carolyn Kisner Lynn Alen Colby,Therapeutic Exercise Foundation and Technique 3rd edition p664-665

Breathing exercise are corporate in into the overall pulmonary rehabilitation of program of patients with acute and chronic pulmonary disorder. Breathing exercise are designed to retain the muscle of

respiration improve or redistribute ventilation, lessen the work of breathing, improve gaseous exchange ,oxygenation.

Diaphragmatic breathing

12. AshaHasimy Mohd Hasim Dr Zainal Abidi Zainudeen ,Muscle activity during diaphragmatic breathing compared to abdominal crunches –A pilot study

Diaphragmatic breathing exercise are designed to improve the efficiency of ventilation ,decreased work of breathing. It is always used to mobilize the secretion during postural drainage.

13.Carolyn Kisner Lynn Alen Colby Therapeutic Exercise p671

Diaphragmatic breathing is 3 dimensional involving all sides of lower ribs .It is done with the middle of torse involving a gentle expansion of lower rib as the diaphragm draws downward. This diaphragmatic breathing is marked by the expansion of abdomen rather than chest when breathing . it is the most efficient breathing compared to other techniques

Purse lip Breathing

14.Carolyn Kisner Lynn Alen Colby Therapeutic Exercise p671

It is thought to be keep airways open by creating a back pressure in the airways. It is thought to help a patient with COPD studies suggest that purse lip breathing decreases respiratory rate and increases tidal volume and tolerance

15. Jennifer A Proyr Amnani Prasad Physitherapy for respiratory condition 3rd edition

Purse lip breathing is often used in patients severe airway disease. By opposing the lips during expiration the airway pressure inside the chest is maintained preventing the floppy airways from collapsing

16. E.H.Breslinn the pattern of respiratory muscle recruitment in purse lip breathing A chest journal

Purse lip breathing is performed as expiratory blowing against pursed lip is a pulmonary rehabilitation strategy incentively or voluntary employed in patients with COPD to control dypsnoea.It provides apperception of control over breathing

17. Principles and practice of Cardio pulmonary Physical therapy – Elizabeth Dean 3rd edition

Relaxed Purse lip breathing is also a technique used to reduce respiratory rate. By prolonging the expiratory phase through

pursed lip the patient secondarily decreases respiratory rate, it is good enough to reduce the shortness of breath

3 METHODOLOGY

3.1Study design:

The type of study design used for the present study is a randomized pre test post test control group design.

Group A: These patients received muscle energy technique along with conventional physiotherapy.

Group B: These patients received proprioceptive neuromuscular technique along with conventional physiotherapy.

Group C: These patients received conventional physiotherapy only.

3.2Source of data:

Bishop Benziger Hospital, Kollam, Kerala.

3.3Sample and Sampling method:

30 patients satisfying the criteria were divided into three groups and 10 patients each in simple random sampling.

Group A: Experimental group I

Group B: Experimental group II

Group C: Control group

3.4 Inclusion Criteria:

- COPD above 45 years and below 60 years.
- Both male and female.
- Patients with chronic bronchitis and emphysema.
- Patient had air flow obstruction. (FEV1/ FEC is <80%)

3.5 Exclusion criteria:

- Patient with unstable cardiac disease
- Acute rib fracture.
- Subjects who are unable to perform pulmonary function testing.
- Severe osteoporosis.
- Patients with infectious disease like tuberculosis Pneumonia.
- Malignancy of lung.
- Psychiatric illness.
- Chest wall deformity.
- Patients in ICU.

3.6 Tools and Materials:

1. Pulmonary function testing
2. Pulse oxymeter

3.7 Variables

3.7.1 Dependent Variables:

- FeV1
- Vital capacity

3.7.2 Independent Variables:

1. Propriceptive neuromuscular facilitation (PNF).
2. Muscle energy technique (MET).
3. Conventional physical therapy.

3.8 Procedure:

The patient in Group A (experimental group 1) groups were given MET along with breathing exercise and chest mobilization exercise.

The patients in Group B (experimental group 2) were given PNF breathing technique along with breathing exercise and chest mobilization exercise.

Group C (control group) were given breathing exercise and chest mobilization exercise only.

All the three groups are treated for 15 minutes, two sessions per day for 2-weeks.

Proprioceptive neuromuscular facilitation:

All procedure and techniques are used in area of care. Hand alignment is particularly important to guide the force in line with normal chest motion. Stretch reflex is used to facilitate the initiation of inhalation. Continue with repeated stretch through the range to increase the inspiratory volume. Appropriate resistance strengthen the muscle guides the chest motion. Preventing motion on the stronger side will facilitate activity on weaker side.

Patient in Supine:

Therapists both hands were on sternum and apply oblique download pressure, caudal and medial direction towards sternum. Apply pressure on the lower ribs diagonally in caudal and medial direction with both hands by placing obliquely with finger following line of ribs. Exercise over upper ribs is given in the same way by placing hand on pectoral muscle.

Patient in side lying:

Therapists both hands were on the area of treatment over chest wall and give pressure diagonally in a caudal direction and medially to follow the line of ribs. In side lying the supporting surface will restart the motion of the other side of chest. Use one hand over the sternum and other over back to stabilize sand give counter pressure.

Patient in Prone:

Give pressure caudally along the line of ribs place hands on each side of rib cage over the area fingers follow the line of ribs.

Prone on elbow:

Place one hand over the sternum and give pressure on dorsal and caudal direction put the other hand on the spine at the same level of stabilization pressure use the prone position hand placement and pressure.

Facilitation of diaphragm:

Diaphragm was facilitated directly by pushing upward laterally with thumb from below the ribcage. Apply stretch and resist the downward motion of contracting diaphragm. The patient abdominal muscle must be relaxed to reach the diaphragm, to give indirect facilitation for diaphragmatic motion. Place both hands over the abdomen and ask patient to inhale while pushing up to gentle pressure teach the patient to perform this facilitation by themselves.

Muscle Energy Techniques

MET for pectoralis major:

The patient was positioned in supine lying with the head in neutral position. The patient is asked to abduct their arm to the maximum pain free range and as it reaches the end range they are asked to contract the arm to adduction and resistance to equal force is applied to the patients arm while adduction for 10 sec, during this phase ask the patient to go for inhalation. After the use of isometric contraction for 10 sec ask the patient to relax and exhale. After 15-30 sec of latency period the muscle

can be taken to new resting length or stretched more to abduction easily than would have been the case before the contraction.

MET for pectolaris minor:

Patient were in supine lying and asked for flex the arm a preferable range the patient were asked to contract their arm in such a way that their elbow should reach the sternum along with inhalation and our equal counter force is applied as the resistance of 10 sec. After the contraction phase the patient is asked to relax himself and after 15-30 sec again the contractions phase is repeated.

MET for scalene

The patient lies with a folded towel under the upper thoracic area. The head is rotated contra laterally. The full contra lateral rotation of head and neck produces effects on more posterior fibers. A contra lateral 45 degree rotation of head and neck involves middle fibers. A position of slight contra lateral rotation involves the more anterior fibers of scalene.

The practitioner's free hand was placed on the side of the patient head to restrain isometric contraction which will be used to release the saline. The patient was instructed to lift fore head and to attempt to turn the head towards the affected side with appropriate breathing co-operation

After 10 second contractions the head was placed into extension and scalene was stretched and stretch held for 20 seconds. To stretch the posterior fibers the contact hand rests on the second rib below the lateral

aspect of clavicle. To stretch middle fiber the hand placement was on the 2nd rib below the centre of clavicle and for anterior fibers hand placement is on the sternum.

MET for sternocleido mastoid:

The patient was in supine with the head supported in neutral position by one hand of the practitioner's hand. The shoulder was rested on a folded towel so that the head is placed in a slight extension. The patient contra lateral head rest on the upper aspect pressure was applied during the stretch phase of the operation.

The patient was asked to the lift the fully rotated head small degree towards the ceiling and to hold the breath. After 10 second of isometric contraction the patient was asked slowly release the effort and to place the head on a table. So that a small degree of extension occurs. The practitioner's hands cover the patient's hand which is rest on the sternum and apply stretch to sternum for 20 second.

MET for trapezius:

The patient was in supine, the side of arm to be treated was lying, the trunk head and neck are away from the side being treated while the practitioners stabilizes the shoulders with the one hand and cups the mastoid area of same side of head with other.

When with the neck fully side bend and half rotated contra laterally the posterior fiber of the upper trapezius are involved in contraction with the neck fully side bend and half rotated the middle fibers contracted and

with the neck fully side bend and slightly rotated towards the side to be treated the anterior fiber of the upper trapezius contracted

The patient introduces a 20% available strength to take the stabilized shoulder towards the ear and the ear towards the shoulder. After 10 seconds contraction and up on complete relaxation, the practitioners gently eases the head and neck to increase side bending and rotation.

Breathing exercise:

Diaphragmatic breathing exercise:

Patient in relaxed and comfortable position in reclined sitting. Place therapist hand on rectus abdomen just below the anterior costal margin.

The patient is asked to breathe slowly and deeply through nose. Have the patient keep shoulders relaxed and upper chest quiet allowing abdomen to rise.

Then the patients were asked slowly to let all air out using controlled expiration through mouth.

This was Practiced three or four times and then rest, do not allow the patient to hyperventilate, fore lift and prolonged expiration should be avoid.

Pursed Lip Breathing:

The patients were in relaxed and comfortable position such as half lying.

The patient were explained that expiration must be relaxed (passive) and that contraction of abdominals must be avoided.

Therapist placed hand over the patient's abdominal muscle to detect any contraction of abdominals. Instruct was given to the patient to breathe in slowly and deeply then have the patient loosely purse the lips and exhale slowly twice as long inhalation patient was discouraged to perform forceful or prolonged expiation during the performance of the exercise.

Chest Mobilization Exercise:

The patient was made in a comfortable sitting position with hand rest on the thigh. Ask the patient to breathe in slowly and while inspire raise the upper limb in elbow extension to 180* and hold the breathe and upper limb to 5 sec.

Then the patient was asked to expire slowly and during expiration to bring the upper limb to starting position.

4 DATA ANALYSIS AND RESULT

4.1Data analysis

The data collected from 30 subjects are analyzed by one way ANOVA.

Table: I

Source of variant	df	Sum of Square	Mean square	Obtained f ratio	Table f ration
SST	29	2.33	0.08	F=7.636	3.35
SSB	2	0.839	0.42		
SSW	27	1.49	0.055		

Table I shows the F ratio value of FeV1 among 3 groups

Table: II

Source of variant	df	Sum of Square	Mean square	Obtained f ratio	Table f ration
SST	29	1.18	0.040	F=30.82	3.35
SSB	2	0.82	0.41		
SSW	27	0.36	0.0133		

Table II shows the F ratio of Vital capacity among 3 groups

Figure I

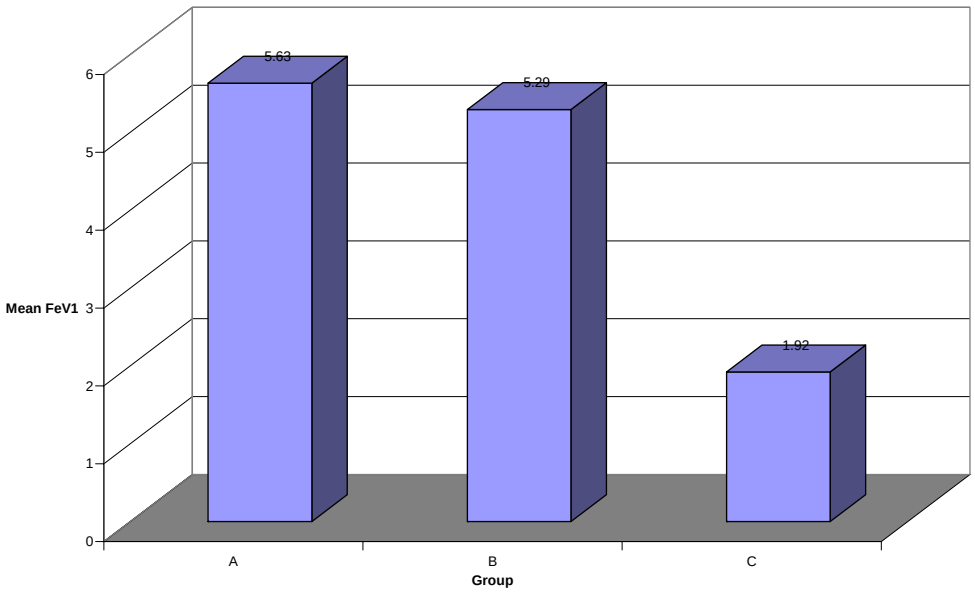

Figure I shows that the mean difference value of FeV1 of all the 3 groups.

Figure II

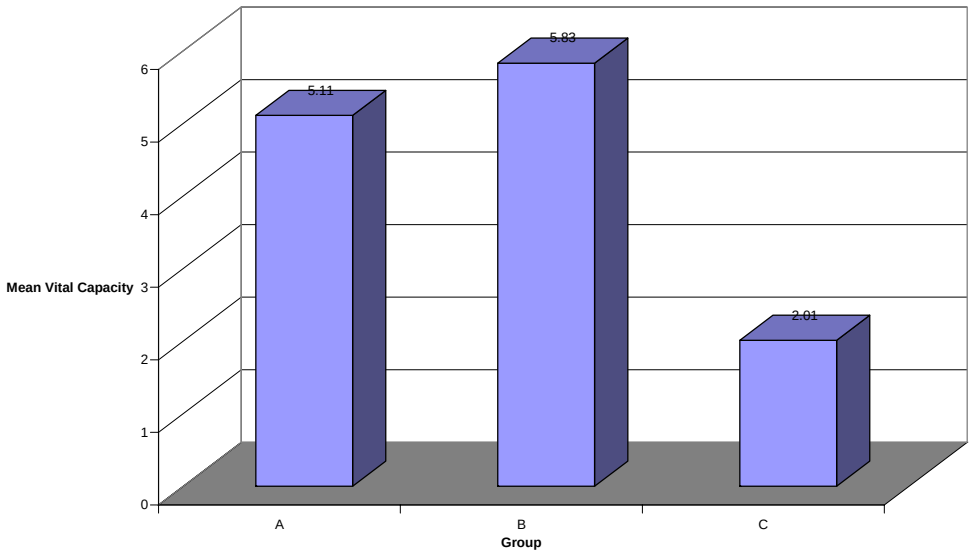

Figure II shows the mean difference value of Vital capacity of all the 3 groups.

4.2 RESULTS

30 subjects were randomly selected into 3groups of each with 10 subjects. The group A was given Muscle Energy Techniques along with conventional physiotherapy. The group B was given Proprioceptive neuromuscular facilitation technique along with conventional physiotherapy and the group C was given only conventional physiotherapy. All the 3 groups FeV1 and Vital capacity values were analyzed before and after intervention.

When FeV1 values of all the three Groups were statistically analyzed by one way ANOVA, the obtained F ratio is 7.636 and the table F ratio is 3.35 at 0.005level.

The above value shows that there is significant difference in FeV1 value among all groups. Hence we accept the alternate hypothesis H_{A1} and reject the null hypothesis.

When Vital capacity values of all the three Groups were statistically analyzed by one way ANOVA the obtained F ratio is 30.82 and the table F ratio is 3.35 at 0.005 level.

The above value shows that there is significant difference in Vital capacity value among 3 groups. Hence we accept the alternate hypothesis H_{A2} and reject the null hypothesis.

When comparing the mean value of FeV1 of all the 3 groups, Group A which received MET showed more difference than other two groups and group B which received PNF showed more difference than Group C which received conventional physiotherapy. Hence we can

conclude that MET stands first and PNF stands second in improving FeV1 among COPD patients.

When comparing the mean value of Vital capacity of all the 3 group, Group B which received PNF showed more difference than other two groups and group A which received MET showed more difference than Group C which received conventional physiotherapy. Hence we can conclude that PNF stands first and MET stands second in improving Vital capacity among COPD patients.

5. CONCLUSION

Chronic obstructive pulmonary disease defined as a progressive disease with air flow limitation that is not fully reversible and that is associated with abnormal inflammatory response of the lungs to noxious particles or gases. Physical therapy combining breathing exercise, chest physiotherapy, postural drainage and varies modern techniques are used to treat the COPD patients. This study projects the importance of Muscle energy techniques and Proprioceptive neuro muscular facilitation techniques in the management of COPD patients.

When comparing the mean value of all the 3 group, Group A which received MET showed more difference than other two groups and group B which received PNF showed more difference than Group C which received conventional physiotherapy. Hence we can conclude that MET stands first and PNF stands second in improving FeV1among COPD patients.

When comparing the mean value of all the 3 group, Group B which received PNF showed more difference than other two groups and group A which received MET showed more difference than Group C which received conventional physiotherapy. Hence we can conclude that PNF stands first and MET stands second in improving Vital capacity among COPD patients.

RECOMMENDATION

- To establish the efficiency of the treatment a large sample size study can done.
- For more valid result, a long term study must can be carried out.
- Follow up programs can be included to assess the long term effects of treatment.
- Further study can be conducted to check the effects of these techniques on other respiratory conditions.
- Specific condition wise study can be conducted.
- Other pulmonary variable can be included.

LIMITATIONS

- Food habits.
- Personal habits like smoking, alcoholism and tobacco.
- Exposure to climate.

6. BIBILOGRAPHY

1. Asha Hasnimy Mohd Hashim, Dr. Zainal Abidin Zainuddin, Halijah Ibrahim, Muscle Activity During disaphragmatic breathing Compared to Abdominal Crunches: A Pilot Study

2. Carokyan Kisner, Lynn Allen Colby, Therapeutic exercise foundation and technique 3rd edition, p671

3. Carokyn kisner, Lynn Allen Colby, Therapeutic exercise foundation and technique 3rd edition, p664-665

4. D.S Postma Effects of home rehabilitation on Physical performance in patients with Chronic obstructive Pulmonary disease, European respiratory journal, 104-110,1996

5. Donald R Noll,DO: Brian F. Degenhardt,DO; Christian, MA; Selina A. Burt, DO, Immediate Effects of Osteopathic Manipulative Treatment in Elderly patients With Chronic Obstructive Pulmonary Disease.

6. EH Breslin, The pattern of respiratory muscle recruitment in pursed lip breathing, chest journal.

7. Harsh Mohan,Text book of Pathology, 2nd edition, 1994,p458

8. Jennifer A.Pryor, S. Ammani Prasad,Physiotherapy for respiratory and cardiac Problems, third edition, p

9. Lenehan,KL, Fryer.Gary, McLaughin,patrick, The effect of muscle energy technique on gross trunk range of Motion.

10. Michael T.Putt,MBBS, Michelle Watson,Bphty, Helen seale, bphty,Jennifer d paratz, phd Muscle streching technique increases vital capacity and range of motion in patients with chronic obstructive pulmonary disease, journal of American academy of physical medicine and rehabilitation 2008: 89; 1103-7 Respiratory Rehabilitation program, chest journal 1997,1077-1088

11. PJ Wijkstra, Th.W.Van der Mark.J. Kraan,R.van Alten A.g.h peter,

12. Robert C.ward,Raymona J Hruby, John A Jerome, Foundations for Osteopathic Medicine, Second edition, p881

13. Wan C.Tan, Tze P.Ng. COPD in Asia Where East Meets West Chest journal. 2008: 133:517-527

14. Principles and Practice of Cardio pulmonary Physical therapy by Elizabeth Dean 3rd edition

15. Research Methodology by Kothari

7. ANNEXURE-1

RESPIRATORY ASSESMENT FORM

Subjective assessment

Name

Age

Sex

Occupation

Chief complaints

Present medical history

Past medical history

Personal history

History of allergens

History of immunization

Associated problems

Family history

Socio economic history

Psycological history

Subjective evaluation of cardinal symptoms

1.Pain

Pleuritic

Muscle

Skeletal

Neuralgic

Angina

2.Cough

A . Effectiveness

B. Variation

C. Productive/non productive

3 Sputum

A. Color

B. Constitancy

C. Smell

D. Quantity

4.Dysnoea

1-sterenous activity

2-on ordinary activity

3- on < ordinary activity

4-at rest

5.Wheeze

Diurinalvariations

Postural variations

Aggravating factors

Objective assessment

Vitals

Pulse rate

Respiratory rate

Blood pressure

Temperature

On observation

A. level of consciousness

B. built of patient

C. posture

D. head and face evaluation

color

Distress

Puffiness

E. Neck

Usage of acessary muscles

Distention of viens

F. Chest

Expansion

Unmoving chest

Deformity

Moving chest

Pattern of breathing rate depth rhythm

I:E ratio

Symmetry of movement

External of movement

G. Extremity evaluation

Clubbing

Edema

Cyanosis

Tremor

Skin changes

H. External appliances

On palpation

A. Tracheal shift

B. Tenderness

C. Chest expansion

Auxiliary level

Nipple level

Xiphi sternal level

D. Accessory muscle palpation

E. Tactile fremitus

F. Movement of diaphragm

On Percussion

Resonant

Hyper resonant

Hypo resonant

Dull

On auscultation

Normal sounds

Tracheal

Bronchial

Broncho vesicular

Vesicular

Voice sounds

Broncho phony

Ego phony

Whispering pectoriloquy

Added sounds

Wheeze

Crepitus

Pleural rub

Pericardial rub

Heart sounds

On examination

Chest expansion

Spirometry

Musculoskeletal assessment

Neuromuscular assessment

ANEXXURE – II

PULMONARY FUNCTION TESTING UNIT

Vitalograph spirometry

ANEXXURE -III

DATAS OF FeV1 SCORE

Group A		Group B		Group C	
Pre test	Post test	Pre test	Post test	Pretest	Post test
2.27	3.13	2.26	3.14	2.27	2.5
2.45	3.12	2.47	3.13	2.3	2.52
2.46	3.3	2.46	3.39	2.4	2.70
2.37	3.20	2.48	3.16	2.20	2.35
2.48	3.15	2.67	3.28	2.40	2.57
2.49	3.1	2.86	3.02	2.47	2.60
2.89	3.05	2.45	3.15	2.56	2.67
2.80	3.01	2.90	3.01	2.20	2.50
2.90	3.06	2.86	3.02	2.30	2.45
2.60	3.20	2.40	3.00	2.40	2.56

DATAS OF VITAL CAPACITY SCORE

Group A		Group B		Group C	
Pre test	Post test	Pre test	Post test	Pretest	Post test
3.48	3.92	3.40	3.90	3.40	3.6
3.29	3.56	3.25	3.80	3.2	3.5
3.47	3.95	3.16	3.86	3.34	3.46
3.49	3.96	3.24	3.95	3.56	3.70
3.56	4.02	3.56	3.99	3.52	3.76
3.46	4.01	3.46	4.02	3.27	3.57
3.27	3.95	3.20	3.95	3.30	3.50
3.52	3.96	3.26	3.90	3.52	3.76
3.33	3.95	3.30	3.99	3.40	3.52
3.30	3.95	3.29	3.59	3.50	3.65

PATIENT CONSENT FORM

I ……. voluntarily consent to participate in the research named on study **"**Comparative **analysis of MET, PNF and conventional physiotherapy in improving fev1 and vital capacity in COPD patients".**

The researcher has explained me the treatment approach in brief, risk of participation and has answered the question to the study to my satisfaction.

Signature of patient **Signature of researcher**

Signature of witness